REMARKS

Claims 1 - 7 were previously pending. Claims 8 - 16 are herein added. Accordingly, claims 1 - 16 are presently pending in the application.

The Applicant thanks the Examiner for noting the allowable subject matter of claims 2 and 4 (which would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims). It is requested that the rewriting of these claims be held in abeyance until the Examiner has reflected upon the averments herein regarding the patentability of claims 1 - 7 (and new claims 8 - 16).

I. Objection to the Specification

The specification stands objected to for informalities. More precisely, the Examiner objects to the specification for allegedly failing to disclose how the autocorrelation matrix T is determined. In response, is it respectfully asserted that the autocorrelation matrix T is clearly presented in exemplary form on page 18 of the specification, wherein the autocorrelation matrix T is a spectral reflectance distribution R in the form of an n-dimensional vector (wherein n = the number of constituent wavelengths) for every pixel in a tile image.

The Examiner seems to confuse the autocorrelation T matrix (disclosed on page 18 of the specification) with the M matrix (disclosed in the Minami reference provided by Applicant and as referenced on page 17 of the specification). While the M matrix (of the Minami reference) deals with limiting the number of linear independent vectors to those with a quantitative value larger than a noise component, the autocorrelation T matrix (shown in exemplary form on page 18 of the instant specification) deals with a spectral reflectance distribution for every pixel in a

tile image. Autocorrelation is not limited to analysis of any particular characteristic, and the disclosure adequately expresses autocorrelation of an exemplary embodiment, as shown on page 18 of the instant specification. In light of the exemplary embodiment provided, it is respectfully requested that the Examiner reconsider and withdraw this objection.

II. Claim Rejection -- § 102(b)

Claims 1 and 5 - 7 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by "Practical Transform Coding of Multispectral Imagery," by John A. Saghri et al., IEEE Signal Processing Magazine, January 1995, pages 32 - 43 ("Saghri"). For the following reasons, this rejection is respectfully traversed.

Independent claim 1 recites a method comprising: performing principal component analysis on respective tile images to obtain for each tile image a principal component number of sets of principal component vectors and principal component images, and determining from the obtained principal component number of sets (for each tile image) an optimum principal component number of sets of optimum principal component vectors and corresponding optimum principal component images. Claim 7 recites features similar to claim 1, but as an apparatus.

The basis for rejection compares the transform coding of the Saghri reference to the above-noted features of independent claims 1 and 7. This comparison is inapposite, as explained below.

The Saghri reference relates to transform coding of multispectral imagery wherein: (1) the data of a multispectral image set is partitioned; (2) the data undergoes Karhunen-Loeve transformation; (3) resulting eigen planes are mapped to 8-bit eigen images; and (4) the eigen

images are then compressed using a JPEG format (see Fig. 1 and page 34, left column). Importantly, in step (1), the Saghri reference teaches that the multispectral image is partitioned by wavelength band, *e.g.*, band 10 is .90 - 1.03 microns (or 16 bands ranging from .36 to 12.11 microns) (see Fig. 4 and the left column of page 35).

In contradistinction, the instant invention's recitation of segmenting the multispectral image into a plurality of tile images is entirely different from the Saghri reference's teaching of partitioning by band. Indeed, in an exemplary embodiment of the instant invention, element 22a segments the multispectral image into nt tile images TL (L = 1 to nt) (*see* page 14 of the specification). In the example provided on page 14 of the specification, an overall image of 1024 x 1024 pixels (or a total of 1,048,576 pixels) is segmented into tile images of 16 x 16 pixels (or 4,096 tiles of 256 pixels each). Clearly then, Saghri's partitioning into wavelength bands is entirely different from the recitation of independent claims 1 and 5, wherein images are segmented into tiles. Accordingly, we would require that the Examiner reconsider and withdraw this rejection.

Second, even assuming, arguendo, that the feature of performing principal component analysis (as recited by independent claims 1 and 7) could be interpreted to include a Karhunen-Loeve transformation, entirely absent in the Saghri reference is a determination from the obtained principal component number of sets (for each tile image) of an optimum principal component number of sets of optimum principal component vectors and corresponding optimum principal component images.

That is, assuming for the sake of argument that the Saghri reference discloses partitioning of data from an image, principal component analysis, and data compression, the Saghri reference

utterly fails to teach or suggest (for each partitioned data set) determination of an optimum principal component number of sets of optimum principal component vectors and corresponding optimum principal component images. Indeed, the Saghri reference merely relates using all eigen vectors (as compared to an optimum principal component number of sets of optimum principal component vectors as recited by independent claims 1 and 7).

For example, Saghri's page 35, left column relates that "[*e*]***ach*** vector of the spectrally-correlated [sic: spectrally correlated] components from identical locations in each band is multiplied by the KLT transformation matrix to form an output vector of spectrally-decorrelated [sic: spectrally decorrelated] components. The output vectors are placed adjacent to one another, the same as the input vectors, to form the stack of the spectrally decorrleated eigen planes." (Emphasis supplied.) In contradistinction, independent claims 1 and 7 recite an optimum principal component number of sets of optimum principal component vectors and corresponding optimum principal component images.

To explain in greater detail, in an exemplary embodiment of the instant invention, there is a total number of sets of principal component vectors for the tile images, represented by n, derived from the principal component analysis. (*See* page 20, last paragraph.) Additionally in the exemplary embodiment, the principal component vectors are lined up in an order of decreasing eigen values. (*See* page 21, last paragraph.)

In contrast to the Sahri reference, however, not all of the principal component vectors are adopted. That is, in an exemplary embodiment of the instant invention, the ultimate number of principal component vectors adopted is represented by m (*id.*) and $m < n$ (*see* page 20, last paragraph). Accordingly, an optimum principal component number of sets of optimum principal

component vectors and corresponding optimum principal component images is determined as a feature of independent claims 1 and 7, and these features are absolutely absent from the prior art cited as the basis for rejection. Therefore, based on at least the previous, it is respectfully requested that the Examiner reconsider and withdraw this rejection.

III. Claim Rejection -- § 103(a)

Claim 3 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Saghri in view of "Multispectral Color System with an Encoding Format Compatible with the Conventional Tristimulus Model," Th. Keusen, Journal of Image Science and Technology, Vol. 40, No. 6, Nov/Dec 1996, pages 510 - 515 ("Keusen"). For the following reasons, this rejection is respectfully traversed.

Claim 3 depends from claim 1, thereby incorporating all of the features of claim 1. As noted above in relation to the § 102 rejection, the Saghri reference fails to teach or suggest all the features of independent claim 1. Moreover, the Keusen reference perpetuates the deficiencies of the Saghri reference. Accordingly, the alleged obviousness rejection is deficient (*see* M.P.E.P. 2143.03 ("[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art")). Therefore, because of the deficiencies of Saghri and Keusen, it is respectfully requested that the Examiner reconsider and withdraw this rejection.

IV. New Claims

New claims 8 - 13 are averred to be patentable at least because the prior art fails to teach or suggest obtaining (for each tile image) a principal component number of sets of principal component vectors, and determining from these sets an optimum principal component number of

sets of optimum principal component vectors. New claims 14 - 16 are averred to be patentable at least by virtue of their ultimate dependency upon claim 7.

V. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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